

## डॉ. एस. वी. सुनीलकुमार

वैज्ञानिक/इंजीनियर एस.एफ.,  
वायुमंडलीय गतिशीलता शाखा  
अंतरिक्ष भौतिकी प्रयोगशाला,  
विक्रम साराभाई अंतरिक्ष केंद्र,  
तिरुवनंतपुरम 695022  
ईमेल: sv\_sunilkumar[at]vssc[dot]gov[dot]in

---

### शैक्षणिक योग्यता:

- पीएचडी (भौतिकी), केरल विश्वविद्यालय, तिरुवनंतपुरम, भारत (2004)
- एम. फिल (भौतिकी), केरल विश्वविद्यालय, तिरुवनंतपुरम, भारत (1999)
- एम. एससी (भौतिकी), एम. एस. विश्वविद्यालय, तिरुनेलवेली, भारत (1997)
- बी. एससी (भौतिकी), एम. एस. विश्वविद्यालय, तिरुनेलवेली, भारत (1995)

### प्रोफेशनल बैकग्राउंड:

- वैज्ञानिक एसएफ, एसपीएल, वीएसएससी : जुलाई 2018 - वर्तमान
- वैज्ञानिक एसई, एसपीएल, वीएसएससी : जुलाई 2012 - जून 2018
- वैज्ञानिक एसडी, एसपीएल, वीएसएससी : फरवरी 2006 - जून 2012
- वैज्ञानिक बी, एरीस, नैनीताल : दिसंबर 2004 - फरवरी 2006
- रिसर्च एसोसिएट, एसपीएल, वीएसएससी : सितंबर 2004 - दिसंबर 2004
- सीनियर रिसर्च फेलो, एसपीएल, वीएसएससी : अगस्त 1999 - जुलाई 2004

### विशेषज्ञता और अनुसंधान हितों का क्षेत्र:

ऊपरी क्षोभमंडल और निचले समताप मंडल (UTLS) में क्षोभमंडल-समताप मंडल युग्मन प्रक्रियाएं, जल वाष्प, ओजोन और एरोसोल, अशांति, उष्णकटिबंधीय सिरस, समताप मंडल-क्षोभमंडल विनिमय (STE) प्रक्रिया, लिडार, रडार और उपग्रह का उपयोग करके वायुमंडल का रिमोट सेंसिंग

### वैज्ञानिक प्रकाशन

- पीयर ने पत्रिकाओं/कार्यवाहियों में प्रकाशनों की समीक्षा की : 48
- अन्य कार्यवाही : 17
- पुस्तकों में अध्याय : 01
- वैज्ञानिक रिपोर्ट : 01
- संगोष्ठी प्रस्तुतियाँ : 59

### शैक्षणिक जिम्मेदारियां

- पीएचडी थीसिस पर्यवेक्षण: 2 पूर्ण, 1 जारी
- केरल विश्वविद्यालय और CUSAT में पीएचडी के लिए मान्यता प्राप्त अनुसंधान पर्यवेक्षक
- सदस्य, एसआरएम विश्वविद्यालय, चेन्नई के अनुसंधान अध्येताओं की डॉक्टरेट समिति
- सदस्य, सीयूएसएटी अनुसंधान/अनुसंधान अध्येताओं के लिए डॉक्टरेट समितियां
- जर्नल्स के समीक्षक: JASTP, IJRSP, JGR, AR, क्लाइमेट डायनेमिक्स

**Dr. S. V. SUNILKUMAR**

Scientist/Engineer SF,  
Atmospheric Dynamics Branch  
Space Physics Laboratory,  
Vikram Sarabhai Space Centre,  
Thiruvananthapuram 695022

Email: [sv\\_sunilkumar at vssc dot gov dot in](mailto:sv_sunilkumar@vssc.gov.in)

---

**Academic Qualifications:**

Ph. D (Physics), *University of Kerala, Thiruvananthapuram, India (2004)*  
M. Phil (Physics), *University of Kerala, Thiruvananthapuram, India (1999)*  
M. Sc (Physics), *M. S. University, Tirunelveli, India (1997)*  
B. Sc (Physics), *M. S. University, Tirunelveli, India (1995)*

**Professional Background:**

Scientist SF, SPL, VSSC : July 2018 – present  
Scientist SE, SPL, VSSC : July 2012 – June 2018  
Scientist SD, SPL, VSSC : February 2006 – June 2012  
*Scientist B*, ARIES, Nainital : December 2004 – February 2006  
*Research Associate*, SPL, VSSC : September 2004 – December 2004  
*Senior Research Fellow*, SPL, VSSC : August 1999 – July 2004

**Area of specialization & Research interests:**

**Troposphere-Stratosphere coupling Processes**, Water vapour, Ozone and Aerosols in the in Upper Troposphere and Lower Stratosphere (UTLS), Turbulence, Tropical cirrus, Stratosphere-Troposphere Exchange (STE) Process, Remote Sensing of the Atmosphere using Lidar, Radar and Satellite

**Scientific publications**

Peer reviewed Publications in Journals/Proceedings : 48  
Other Proceedings : 17  
Chapters in Books : 01  
Scientific Reports : 01  
Symposium Presentations : 59

**Academic Responsibilities**

- PhD thesis Supervision: 2 completed, 1 Ongoing
- Recognized Research Supervisor for Ph.D at University of Kerala and CUSAT
- Member, Doctoral Committee of Research Fellows of SRM university, Chennai
- Member, CUSAT Research/Doctoral Committees for Research fellows
- Reviewer of Journals: JASTP, IJRSP, JGR, AR, Climate dynamics

### प्रमुख जिम्मेदारियाँ/Major Responsibilities:

- Development of prototype of an instrument for "Solar occultation Experiment" under TDP (R&D) for profiling aerosols, thin clouds, trace gas in the troposphere and lower stratosphere [**Principal Investigator**].
- Development of Payload "Solar occultation Photometry for vertical profiling of Aerosols and thin clouds in Venusian atmosphere" (SPAV) for the upcoming ISRO's Venus mission [**Principal Investigator**].
- **International Alliance for Research on "Indian Ocean Dipole (IOD)" (Co-Investigator)**. The proposal aims to examine the climatic and environmental perturbations during the strongest IOD event in 2019 through international joint efforts. Responsibility is to focus on "Improving the understanding of UTLS processes in response to IOD events". Conducted weekly balloons flights from TERLS during October-December 2019 (Total: 10 flights) for studying the impact of IOD event in the Upper Troposphere and Lower Stratosphere (UTLS). The data obtained from radiosonde and ozonesonde are being analysed to study the impact of IOD.
- GPS Aided Radiosonde Network Experiments for Troposphere stratosphere Studies (**GARNETS**) program under TDP (R&D) [**Principal Investigator**]: *For the first time, designed an approach and conducted in situ measurements (balloon-borne experiments) of water vapour and ozone in the upper troposphere and lower troposphere (UTLS) over the hotspots (deep convective outflow regions) & non-hotspots regions of Indian region. Light-weight sensors such as **Cryogenic Frost-point Hygrometers (125 Nos)**, Ozonesondes (160 Nos) and GPS-radiosondes (750 nos) are flown balloons from Thumba, Hyderabad, Kolkata during 2014-2020.*
- Validated VSSC developed Dr. Pisharoty sondes from a net of stations over India and over Indian Ocean.
- Designed, coordinated and executed the **Tropical Tropopause Dynamics (TTD) campaigns** under **ISRO's CAWSES-India Phase-II program**. Simultaneous balloon flights from Thumba and Gadanki at 3 hour interval for 3 consecutive days in each month during December 2010- March 2014 and obtained 1300 radiosonde profiles from 40 campaigns [**Principal Investigator**].

### प्रमुख वैज्ञानिक उपलब्धियाँ/Major Scientific Accomplishments:

- New perspective of Tropical Tropopause Layer (TTL) and demonstrated the sub-layers in the TTL
- Global structure of TTL and structure of static stability across their sub-layers over the tropics
- Distribution of water vapour, Ozone, cirrus and deep clouds across the sub-layers of TTL
- Long-term and short-term variabilities of Tropical tropopause and their association with QBO and ENSO
- Turbulence characteristics in the troposphere and in lower stratosphere and their generations
- Comprehensive study on the Water vapour and Ozone viability in the UTLS region over Monsoon region.
- Comprehensive study on tropical cirrus and aerosol distribution in the UTLS region over India.

All these studies were carried out over the Indian region by integrating lidar and balloon-borne observations with satellite observations of KALPANA-1, CALIPSO and Aura-Microwave Limb Sounder.

### संदर्भित प्रकाशन/REFEREED PUBLICATIONS

1. *Satheesh Chandran P.R., S.V. Sunilkumar, M. Muhsin, Maria Emmanuel, Geetha Ramkumar, Prabha R Nair, Effect of meteorology on the variability of ozone in the troposphere and lower stratosphere over a tropical station Thumba (8.5°N, 76.9°E), Journal of Atmospheric and Solar-Terrestrial Physics, 215, <https://doi.org/10.1016/j.jastp.2021.105567>, 2021.*
2. Emmanuel. M, **S. V. Sunilkumar**, M. Muhsin, K. Parameswaran, P. R. Satheesh Chandran, B. Suneel Kumar, A. Maitra, A. N. V. Satyanarayana, N. Nagendra, Effect of monsoon dynamics and deep

- convection on the upper troposphere lower stratosphere water vapour over Indian monsoon region, *Atmospheric Research*, doi:<https://doi.org/10.1016/j.atmosres.2020.105336>, 2020.
3. Muhsin, M., **S.V. Sunilkumar\***, M. Venkat Ratnam, K. Parameswaran, K. Mohankumar, S. Mahadevan, K. Murugadass, P.M. Muraleedharan, B. Suneel Kumar, N. Nagendra, Maria Emmanuel, P.R.Satheesh Chandran, N. Koushik, Geetha Ramkumar, B.V. Krishna Murthy, Contrasting features of tropospheric turbulence over the Indian peninsula, *Journal of Atmospheric and Solar-Terrestrial Physics*, 197, <https://doi.org/10.1016/j.jastp.2019.105179>, 2020.
  4. Hemanth Kumar, A. and **S.V. Sunilkumar\***, Assessment of INSAT-3D retrieved temperature and water vapour with collocated radiosonde measurements over Indian region *IEEE Transactions on Geoscience and Remote Sensing*, DOI: 10.1109/TGRS.2019.2960277, 2020.
  5. Ajayakumar R. S, Prabha R. Nair\*, Imran Asatar Girach, **S.V. Sunilkumar**, M. Muhsin, P.R. Satheesh Chandran, Dynamical nature of tropospheric ozone over a tropical location in Peninsular India: Role of transport and water vapour, *Atmospheric Environment*, 218, <https://doi.org/10.1016/j.atmosenv.2019.117018>, 2019.
  6. Emmanuel M., **S. V. Sunilkumar**, M. Muhsin, B. Suneel Kumar, N. Nagendra, Geetha Ramkumar, K. Rajeev, and K. Parameswaran, Annual cycle of water vapour in the lower stratosphere over the Indian Peninsula derived from Cryogenic Frost-point Hygrometer observations, *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2018-630>, 2018.
  7. Emmanuel M, S.V. Sunilkumar, M. Venkat Ratnam, M Muhsin, K. Parameswaran, B.V. Krishna Murthy, Diurnal variation of the tropospheric water vapour over a coastal and an inland station in southern Indian Peninsula, *Journal of Atmospheric and Solar-Terrestrial Physics*, doi: <https://doi.org/10.1016/j.jastp.2018.06.007> (2018).
  8. Emmanuel M, S. V. Sunilkumar, M. Muhsin, B. Suneel Kumar, N. Nagendra, P.R. Satheesh Chandran, Geetha Ramkumar, K. Rajeev, Inter-comparison of Cryogenic Frost-point Hygrometer observations with SAPHIR, MLS, COSMIC, radiosonde and reanalysis datasets over Indian Peninsula, *IEEE Transactions on Geoscience and Remote Sensing*, doi: 10.1109/TGRS.2018.2834154 (2018).
  9. Muhsin M., S. V. Sunilkumar, M. Venkat Ratnam, K. Parameswaran, B. V. Krishna Murthy, and M. Emmanuel, Effect of convection on the thermal structure of the troposphere and lower stratosphere including the Tropical Tropopause Layer in the South Asian monsoon region, *Journal of Atmospheric and Solar-Terrestrial Physics*, 169, 52-65, doi: <https://doi.org/10.1016/j.jastp.2018.01.016> (2018).
  10. Hemanth Kumar Alladi, M Venkat Ratnam, S.V. Sunilkumar, K Parameswaran, B V Krishna Murthy, Cross tropopause flux observed at sub-daily scales over south India monsoon regions. *Atmospheric Research*, 201, 72-85, doi:10.1016/j.atmosres.2017.10.017 (2018).
  11. Muhsin, M., S.V. Sunilkumar, M. Venkat Ratnam, B.V. Krishna Murthy and K. Parameswaran, Seasonal and diurnal variations of Tropical Tropopause Layer (TTL) over the Indian Peninsula, *Journal of Geophysical Research- Atmospheres*, 122, doi:10.1002/2017JD027056 (2017).
  12. Anurose, T.J., D.B. Subrahmanyam, **S.V. Sunilkumar**, Two years observations on the diurnal evolution of atmospheric boundary layer features over Thiruvananthapuram (8.5 °N, 76.9 °E), India, *Theoretical and Applied Climatology*, doi:10.1007/s00704-016-1955-y, 2017.
  13. Mehta, S., M.VenkatRatnam, **S.V. Sunilkumar**, D.N. Rao, B.V. Krishan Murthy, Diurnal variability of the Atmospheric layer height over a tropical station in the Indian Monsoon region, *Atmos. Chem. Phys.*, 17, 531–549, doi:10.5194/acp-17-531-2017, 2017.
  14. **Sunilkumar S.V.**, M. Muhsin, M. Venkat Ratnam, K. Parameswaran, B.V. Krishna Murthy, Maria Emmanuel, Boundaries of Tropical Tropopause Layer (TTL): A new perspective based on thermal and stability profiles, *Journal of Geophysical Research*, 122, 741-754, doi:10.1002/2016JD025217, 2017.
  15. Rajeev, K., M. K. Mishra, **S.V. Sunilkumar**, S. Sijikumar, Dual polarization micropulse lidar observations of the diurnal evolution of atmospheric boundary layer over a tropical coastal station, *Proc. of SPIE* 9879,

- Lidar remote sensing for Industry and Environment Monitoring XV*, Vol. 98790V, doi:10.1117/12.2228049, 2016.
16. Muhsin M, **Sunilkumar S V**, M. Venkat Ratnam, K. Parameswaran, B. V. Krishna Murthy, Geetha Ramkumar, K. Rajeev, Diurnal variation of turbulence in the troposphere and lower stratosphere derived from simultaneous radiosonde observations at two tropical stations, in the Indian Peninsula, *Atmospheric Research*, 180, 12-23, doi:10.1016/atmosres.2016.04.021, 2016.
  17. **Sunilkumar, S V**, Muhsin M, Maria Emmanuel, Geetha Ramkumar, K Rajeev, S Sijikumar, Balloon-borne Cryogenic Frost-point Hygrometer (FPH) observations of water vapour in the tropical upper troposphere and lower stratosphere (UTLS) over India: First results, *J. Atmos. Sol.-Terr. Phys.*, 2016, 140, 86-93, 2016, doi:10.1016/j.jastp.2016.02.014.
  18. Hemanth Kumar A., M. Venkat Ratnam, **S.V. Sunilkumar**, K. Parameswaran, B.V. Krishna Murthy, Role of deep convection on the tropical tropopause characteristics at sub-daily scales over the South India monsoon region, *Atmospheric Research*, 161–162, 14–24, 2015.
  19. **Sunilkumar S V**, M. Muhsin, K. Parameswaran, M. Venkat Ratnam, Geetha Ramkumar, K. Rajeev, B. V. Krishna Murthy, K.V. Sambhu Namboodiri, K.V. Subrahmanyam, K. Kishore Kumar, Siddarth Sankar Das, Characteristics of Turbulence in the Troposphere and Lower Stratosphere over the Indian Peninsula, *J. Atmos. Sol.-Terr. Phys.*, 133, 26-53, doi:10.1016/j.jastp.2015.07.015, 2015..
  20. Ratnam, M.V, **S.V. Sunilkumar**, K. Parameswaran, B.V. Krishna Murthy, Geetha Ramkumar, K. Rajeev, Ghose Basha, S. Ravindra Babu, M .Muhsin, Manoj Kumar Mishra, A. Hemanth Kumar, S.T. Akhil Raj, M. Pramitha, Tropical Tropopause Dynamics (TTD) Campaigns over Indian region: an over-view. *J. Atmos. Sol.-Terr. Phys.*, 121, 229–239, 2014a.
  21. Ravindra Babu, S., Ratnam, M.V, **S.V. Sunilkumar**, K. Parameswaran, B.V. KrishnaMurthy, Detection of tropopause altitude using Indian MST radar data and comparison with simultaneous radiosonde observations. *J. Atmos. Sol -Terr. Phys.*, 121, 240–247, 2014b
  22. Geetha Ramkumar, K. V. Subrahmanyam, K. K. Kumar, S.S Das, D. Swain, **S. V. Sunilkumar**, K. V. S. Namboodiri, K.N.Uma, V.S. Babu, S.R. John and Asha Babu, First observational study of eclipse induced variations in the horizontal winds simultaneously in the troposphere-stratosphere-mesosphere-lower thermosphere region over the equatorial station Thumba (8.5° N, 77° E), *Earth Planet & Space*, doi:10.5047/eps.2012.12.007., 2013.
  23. **Sunilkumar, S.V.**, K. Parameswaran, and Asha Babu, Mean structure of the tropical tropopause and its variability over the Indian longitude sector, *Climate Dynamics*, DOI 10.1007/s00382-012-1496-8, 1125-1140, 2013.
  24. Bijoy V Thampi, K. Parameswaran, **S.V. Sunilkumar**, Semitransparent cirrus clouds in the upper troposphere and their contribution to the particulate scattering in the Tropical UTLS region, *J. Atmos. Sol. Terres. Phy.*, doi:10.1016/j.jastp.2011.09.005, 74, 1–10, 2012.
  25. **Sunilkumar, S. V.**, K. Parameswaran, B. V. Thampi, and G. Ramkumar, Variability in background stratospheric aerosols over the tropics and its association with atmospheric dynamics, *J. Geophys. Res.*, 116, D13204, doi:10.1029/2010JD015213, 2011.
  26. Subrahmanyam, K.V., Geetha Ramkumar, K.K. Kumar, D. Swain, **S.V. Sunilkumar**, S. S. Das and K.V.S. Namboodiri, Temperature perturbation in the troposphere-Stratosphere at Trivandrum during the Solar Eclipse 2009/2010, *Annales Geophysicae*, 29, 275-282, 2011.
  27. Parameswaran, K., B. V Thampi, **S. V. Sunilkumar**, Latitudinal dependence of the seasonal variation of particulate extinction in the UTLS over the Indian longitude sector during volcanically quiescent period based on Lidar and SAGE-II observations, *J. Atmos. Sol. Terres. Phy.*, doi:10.1016/j.jastp.2010.06.004, 72, 1024-1035,2010b.
  28. **Sunilkumar, S. V.**, K. Parameswaran, K. Rajeev, B. V. Krishna Murthy, S. Meenu, Sanjay Mehta, and Asha Babu Semitransparent Cirrus clouds in the Tropical Tropopause Layer during two contrasting seasons, *J. Atmos. Sol. Terres. Phy.*, doi:10.1016/j.jastp.2010.03.020, 72, 745-762, 2010a.

29. Thampi B.V., **S.V. Sunilkumar**, K. Parameswaran, Lidar studies of particulates in the UTLS region at a tropical station over the Indian Subcontinent, *J. Geophys. Res.*, **114**, D08204, doi:10.1029/2008JD010556, 2009.
30. Antonita, T. M., G. Ramkumar, K.K.Kumar and **S.V. Sunilkumar**, Quantification of gravity wave forcing in driving the stratospheric Quasi-biennial Oscillation, *Geophys. Res. Lett.*, L09805, doi:10.1029/2008GL033960, 2008.
31. Rajeev, K., K. Parameswaran, S. Meenu, **S. V. Sunilkumar**, Bijoy V Thampi, C. Suresh Raju, B. V. Krishna Murthy, K. S. Jagannath, S. K. Mehta, D. N. Rao, and K. G. Rao, Observational assessment of the potential of satellite-based water vapour and thermal IR brightness temperatures in detecting semitransparent cirrus, *Geophys. Res. Lett.*, **35**, L08808, doi:10.1029/2008GL033393, 2008.
32. **Sunilkumar, S. V.**, K. Parameswaran, Bijoy V Thampi, Interdependence of tropical cirrus properties and its variability, *Annales Geophys.*, **26**, 413-429, 2008.
33. K. Parameswaran, **S. V. Sunilkumar**, K. Rajeev, C. Suresh Raju, K. S. Jagannath, Tropical cirrus and Tropospheric turbulence, Proc. of the Conference of the International Tropical Atmospheric Radar (INTAR) Colloquium, 110-121, 2007.
34. Moorthy, K. K., S. S. Babu, K.V.S. Badarinath, **S. V. Sunilkumar**, T.R. Kiranchand, Y. Nazeer Ahmed, Latitudinal distributions of aerosol black carbon and its mass fraction to composite aerosols over peninsular India during winter season, *Geophys. Res. Lett.*, **34**, L08802, doi:10.1029/2006GL029150, 2007.
35. Nair, P R., George, S K., **Sunilkumar, S V.**, Parameswaran, K., Jacob, S., Abraham, A., Chemical composition of aerosols over peninsular India during winter, *Atmos. Environ.*, **40**, 6477-6493, 2006.
36. Parameswaran, K., **S.V. Sunilkumar**, K. Rajeev, C. Suresh Raju, D Narayana Rao, Sanjay K Mehta, B. V. Krishna Murthy, S.C. Chakravarthy, Kusuma G. Rao and K. S. Jaganath, Cirrus clouds in the Tropical Tropopause Layer, Proc. on 'Technical and Scientific Aspects of MST Radar (MST11)', Macmillan Advanced Research Series, 552-558, 2006
37. **Sunilkumar, S. V.** and K. Parameswaran, Temperature dependence of tropical cirrus properties and radiative effects, *J. Geophys. Res.*, **110**, D13205, doi:10.1029/2004JD005426, 2005.
38. Moorthy, K. K., **S. V. Sunilkumar**, Preetha S Pillai, K Parameswaran, Prabha Nair, Y Nazeer Ahmed, K Ramgopal, K. Narasimhulu, Rajuru Reddy, V Vinoj, S.K. Satheesh, Kandula Niranjan, B Rao, BS Brahmanandam, Auromeet Saha, K.V.S. Badarinath, T.R. Kiranchand and K Lata, Wintertime spatial characteristics of boundary layer aerosols over peninsular India, *J. Geophys. Res.*, **110**, D08207, doi:10.1029/2004JD005520, 2005.
39. **Sunilkumar, S. V.**, K. Parameswaran, Prabha R Nair, Aerosol properties observed over Arabian Sea during the ARMEX II Experiment, *Mausam*, **56**, 321-326, 2005.
40. Moorthy, K. K., S. S. Babu, **S. V. Sunilkumar**, P. K. Gupta, and B. S. Gera, Altitude profiles of aerosol BC, derived from aircraft measurements over an inland urban location in India, *Geophys. Res. Lett.*, **31**, L22103, doi:10.1029/2004GL021336, 2004.
41. Parameswaran K, **S. V. Sunilkumar**, B. V. Krishna Murthy and K. Satheesan, Lidar observations of high altitude cirrus near the tropical tropopause, *Adv. Space Res.*, **34**, 845-850, doi 10.1016/j.asr.2003.08.64, 2004.
42. Parameswaran K, **S. V. Sunilkumar**, K. Rajeev, Prabha R Nair and K. Krishna Moorthy, Boundary layer aerosols at Trivandrum tropical coast, *Adv. Space Res.*, **34**, 838-844, doi 10.1016/j.asr.2003.08.059, 2004.
43. Nair P. R, K. Parameswaran, **S. V. Sunilkumar**, A. Abraham and S. Jacob, Chemical composition of Atmospheric aerosols over the Indian Ocean: Impact of continental advection, *Adv. Space Res.*, **34**, 828-832, doi:10.1016/j.asr.2003.08.061, 2004.
44. Nair P. R, K. Parameswaran, **S. V. Sunilkumar** and Rekha Rajan, Continental influence on the spatial distribution of particulate loading over the Indian Ocean during winter season, *J. Atmos. Solar and Terr.*

*Phys.*, **66**, 27-38, doi: 10.1016/j.jastp.2003.06.002, 2004.

45. **Sunilkumar, S. V.**, K. Parameswaran, B. V. Krishna Murthy, Lidar Observations of cirrus cloud near the tropical tropopause: General features, *Atmos. Res.*, **66**, 203-227, doi: 10.1016/S0169-8095 (02) 00159-x, 2003.
46. Parameswaran, K., **S. V. Sunilkumar**, B. V. Krishna Murthy, K. Satheesan, and P. R. Nair, Lidar Observations of cirrus cloud near the tropical tropopause: Temporal variations and association with tropospheric turbulence, *Atmos. Res.*, **69**, 29-49, doi: 10.1016/J.atmosres.2003.08.02, 2003.
47. Sasi, M. N, B.V. Krishna Murthy, Geetha Ramkumar, K. Satheesan, K. Parameswaran, K. Rajeev, **S. V. Sunilkumar**, Prabha R. Nair, K. Krishna Moorthy, Y. Bhavanikumar, K. Raghunath, A. R. Jain, P. B. Rao, M. Krishnaiah, S.R. Prabhakaran Nayar, K. Revathy, and S. Devanarayanan, A study of Equatorial wave characteristics using Rockets, Balloons, Lidar and Radar, *Adv. Space Res.*, vol. 32(5), pp 813-818, doi 10.1016/S0273-1177 (03) 00412-5, 2003.
48. Parameswaran K., **S. V. Sunilkumar**, B.V. Krishna Murthy and K. Satheesan, Optical properties of cirrus clouds observed below the tropical tropopause, Proc. of SPIE's International Symposium on Optical Science and Technology, *Lidar remote sensing for Industry and Environment Monitoring II*, Vol. **4484**, 186-197, 2002.

### **पुस्तक में अध्याय/Chapter in Book**

1. Sunilkumar, S.V., Parameswaran. K., Thampi, B.V., Distribution of particulates in the tropical UTLS over the Asian Summer Monsoon region and its association with Atmospheric dynamics, Chapter in Book titled "Atmospheric Aerosols: Regional Characteristics - Chemistry and Physics" (ISBN 979-953-307-897-6) Edited by Hayder Abdul-Razzak; Published by Intech, <http://dx.doi.org/10.5772/50552>, PP 114-162, 2012.

### **वैज्ञानिक रिपोर्ट/Scientific reports**

1. **Sunilkumar, S.V.**, and Rajeev, K., Report on the performance of the First Balloon- borne LIDAR Experiment, SPL:SR:001:2009, May 2009.

### **अन्य कार्यवाही/OTHER PROCEEDINGS**

1. Bijoy V. Thampi, K. Rajeev, K. Parameswaran, Manoj Kumar Mishra, S. V. Sunilkumar, Three-dimensional structure and radiative impact of the Southeast Asian smoke aerosols over the Equatorial Indian Ocean during the 2006 fire event, Proc. International Conference on Megha-Tropiques, Bangalore, 95-96, 23-25 March, 2009.
2. K.Rajeev, S.Meenu, K.Parameswaran, Anish Kumar M. Nair, C.Suresh Raju, S.V.Sunilkumar, KALPANA-1-VHRR and CALIPSO observations of semi-transparent cirrus clouds over the Indian subcontinent and surrounding oceans, Proc. International Conference on Megha-Tropiques, Bangalore, 35-36, 23-25 March, 2009.
3. Rajeev, K., K. Parameswaran, S. Meenu, **S.V. Sunilkumar**, Bijoy V. Thampi, C. Suresh Raju, B.V. Krishna Murthy, K.S. Jagannath, S.K Mehta, D N. Rao, and K.G. Rao, Thin semitransparent cirrus clouds observed using KALPANA-1 VHRR and its intercomparison with the Lidar-derived cirrus optical depth, Proc. of CAWSES-India - 2007.
4. Parameswaran, K., **S.V. Sunilkumar**, Bijoy V Thampi, K. Rajeev, C. Suresh Raju, B.V. Krishna Murthy, S.K Mehta, D.N. Rao and K.G Rao, Properties of cirrus clouds in the Tropical Tropopause Layer, Proc. of CAWSES-India - 2007.
5. Bijoy V Thampi, **S.V. Sunilkumar** and K. Parameswaran, Aerosols in the UTLS region at Tropics, Proceedings of conference on Emerging trends in Aerosols: Technology and Applications, *Bulletin of Indian Aerosol Science and Technology Association (IASTA)*, vol. 18, 272-275, November, 2007.

6. K. Parameswaran and **S.V. Sunilkumar**, Climate Sensitivity and Radiative forcing of tropical cirrus, *Proceedings of the 4<sup>th</sup> Asian Aerosol Conference AAC-2005*, *Bulletin of Indian Aerosol Science and Technology Association (IASTA)*, Vol. 17, 498-499, December 2005.
7. Prabha R Nair, Susan George, K. Parameswaran, **S.V. Sunilkumar**, Salu Jacob, Annamma Abraham, Chemical composition of aerosols at geographically distinct locations over India, *Proceedings of the 4<sup>th</sup> Asian Aerosol Conference AAC-2005*, *Bulletin of Indian Aerosol Science and Technology Association (IASTA)*, Vol. 17, 107-108, December 2005.
8. **Sunilkumar S. V.**, K. Parameswaran and P. R. Nair, Physical properties of near surface aerosols at Trivandrum coast inferred from direct sampling, *Proceedings of the Conference on Aerosol Remote Sensing in Global Change and Atmospheric pollution*, *Bulletin of Indian Aerosol Science and Technology Association (IASTA)*, Vol. 14, 63-66, September 2002.
9. **Sunilkumar S. V.**, K. Parameswaran, B. V. Krishna Murthy and K. Satheesan, Tropical cirrus properties and its association with turbulence, *Proceedings of the Conference on Aerosol Remote Sensing in Global Change and Atmospheric pollution*, *IASTA Bulletin*, Vol. 14, 67-70, September 2002.
10. Nair P. R., K. Parameswaran, **S. V. Sunilkumar**, A. Abraham and S. Jacob, Chemical composition of aerosols over the Indian Ocean during winter, *Proceedings of the Conference on Aerosol Remote Sensing in Global Change and Atmospheric pollution*, *Bulletin of Indian Aerosol Science and Technology Association (IASTA)*, Vol. 14, 162-166, September 2002.
11. **Sunilkumar S. V.**, K. Parameswaran, B.V. Krishna Murthy and K. Satheesan: Scattering properties of cirrus cloud observed near the tropical tropopause, *Proc. of TROPMET-2001*, 603-610, 2001.
12. Parameswaran K., **S.V. Sunilkumar**, P. R. Nair and R. Rajan, Trends in boundary layer aerosol loading at Trivandrum during last one decade, *Proc. of TROPMET-2001*, 569-576, 2001.
13. **Sunilkumar S. V.**, K. Parameswaran, B. V. Krishna Murthy, K. Satheesan, P. R. Nair, Y. Bhavanikumar and M. Krishnaiah, General features of cirrus clouds observed near the tropical tropopause, *Proc. of Fifth user scientists workshop on MST radar results*, 131-142, 2001.
14. Sasi M. N., B. V. Krishna Murthy, Geetha Ram Kumar, K. Satheesan, K. Parameswaran, K. Rajeev, **S. V. Sunilkumar**, P. R. Nair, K. K. Moorthy, Y. Bhavanikumar, K. Raghunath, A. R. Jain, P. B. Rao, M. Krishnaiah, S. R. P. Nayar, K. Revathy and S. Devanarayanan, A study of equatorial waves in tropospheric, stratospheric and mesospheric winds and temperatures, *Proc. of Fifth user scientists workshop on MST radar results*, 63-70, 2001.
15. Parameswaran K., **S.V. Sunilkumar**, P. R. Nair, B.V. Krishna Murthy, S.R. Prabhakaran Nayar, K. Revathy, G. Mrudula, P.B. Rao, Y. Bhavani Kumar, K. Raghunath, and M. Krishnaiah: Atmospheric temperature and aerosol back scatter profiles from simultaneous observations using Lidar and MST Radar, *Bulletin of Indian Aerosol Science and Technology Association (IASTA)*, vol.13, 171-173, Feb 2000.
16. Parameswaran K., **S.V. Sunilkumar**, P. R. Nair, K. K. Moorthy, B.V. Krishna Murthy, S. R. P. Nayar, K. Satheesan, K. Revathy, P.B. Rao, Y. Bhavanikumar, K. Raghunath, and M. Krishnaiah, On the structure of clouds below the tropical tropopause, *Bulletin of Indian Aerosol Science and Technology Association (IASTA)*, vol.13, 174-176, Feb 2000.
17. Parameswaran K., P. R. Nair, Rekha Rajan and **S.V. Sunilkumar**, Surface aerosol characteristics at Trivandrum coast, *Proc. of National Workshop on Atmospheric Chemistry (NWAC-99)*, 111-118, 1999.